

CLAIMS:

- 1) A method of packing an object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a plurality of coded data portions, each coded data portion being indicative of an identity of the object, wherein the method includes, in a sensing device:
 - (a) sensing at least one coded data portion;
 - (b) generating, using the sensed coded data portion, indicating data indicative of the identity of the object; and,
 - (c) transferring the indicating data to at least one of:
 - (i) a packing system which is responsive to the indication to pack the object.
 - (ii) a computer system which is responsive to the indication to cause a packing system to pack the object.
- 2) The method of claim 1, wherein the method includes, in the packing system:
 - (a) receiving the indicating data;
 - (b) generating, from the received indicating data, object identity data indicative of the identity of the object; and,
 - (c) packing the object using the object identity data.
- 3) The method of claim 1, wherein the coded data portions are provided at respective positions on the interface surface, and wherein the method includes, in the sensing device:
 - (a) generating, using the sensed coded data portion, indicating data indicative of the object identity and at least one of:
 - (i) a position of the sensed coded data portion;
 - (ii) a position of the sensing device relative to the interface surface;
 - (iii) an orientation of the sensed coded data; and,
 - (iv) an orientation of the sensing device relative to the interface surface; and,
 - (b) transferring the indicating data to the packing system, the packing system being responsive to the indicating data to determine the orientation of the object.
- 4) The method of claim 3, wherein the method includes, in the packing system:
 - (a) receiving the indicating data;
 - (b) generating, using the received indicating data:
 - (i) object identity data indicative of the identity of the object;
 - (ii) position data indicative of at least one of:
 - (1) the position of the sensed coded data portion;
 - (2) the position of the sensing device relative to the interface surface;
 - (3) the orientation of the sensed coded data; and,
 - (4) the orientation of the sensing device relative to the interface surface; and,

- (c) generating, using the object identity data and the position data, orientation data indicative of the orientation of the object; and,
 - (d) packing the object using the orientation data.
- 5 5) The method of claim 1, wherein the interface surface includes at least one region having at least one coded data portion provided therein, the at least one coded data portion being indicative of an identity of the region, and wherein the method includes, in a sensing device:
 - (a) sensing at least one coded data portion;
 - (b) generating, using the sensed coded data portion, indicating data indicative of the region identity; and,
 - 10 (c) transferring the indicating data to the packing system, the packing system being responsive to the indicating data to determine the orientation of the object.
- 6) The method of claim 5, wherein the method includes, in the packing system:
 - (a) receiving the indicating data;
 - (b) generating, using the received indicating data, region identity data indicative of the identity of the region;
 - 15 (c) generating, using the region identity data, orientation data indicative of the orientation of the object; and,
 - (d) packing the object using the orientation data.
- 20 7) The method of claim 1, wherein the object has a plurality of faces, each face having at least one coded data portion provided at a respective position thereon, and wherein the method includes, in the sensing device:
 - (a) generating, using the sensed coded data portion, indicating data indicative of the object identity and at least one of:
 - 25 (i) the position of the sensed coded data portion;
 - (ii) the position of the sensing device relative to the face;
 - (iii) an orientation of the sensed coded data; and,
 - (iv) an orientation of the sensing device relative to the interface surface; and,
 - (b) transferring the indicating data to the packing system, the packing system being responsive to the indicating data to identify a face.
- 30 8) The method of claim 1, wherein the method includes, in the packing system:
 - (a) receiving the indicating data;
 - (b) generating, using the received indicating data:
 - 35 (i) object identity data indicative of the identity of the object;
 - (ii) position data indicative of at least one of:
 - (iii) the position of the sensed coded data portion;
 - (iv) the position of the sensing device relative to the face;

- (v) the orientation of the sensed coded data; and,
- (vi) the orientation of the sensing device relative to the face; and,
- (c) identifying, using the object identity data and the position data, the face; and,
- (d) packing the object using the determined face.

5 9) The method of claim 1, wherein the object has a plurality of faces, each face having at least one region including at least one coded data portion therein, the at least one coded data portion being indicative of an identity of the at least one region, and wherein the method includes, in the sensing device:

- 10 (a) generating, using the sensed coded data portion, indicating data indicative of the region identity; and,
- (b) transferring the indicating data to a packing system, the packing system being responsive to the indicating data to determine the face.

10) The method of claim 9, wherein the method includes, in the packing system:

- (a) receiving the indicating data;
- 15 (b) generating, using the received indicating data, region identity data indicative of the identity of the region;
- (c) identifying, using the region identity data, the face; and,
- (d) packing the object using the determined face.

20 11) The method of any one of claim 8 and claim 10, wherein the method includes, in the computer system:

- (a) determining the orientation of the object using the face; and,
- (b) packing the object using the determined orientation.

25 12) The method of claim 1, wherein the object is a first object adapted to be packed in a second object, the second object having second coded data disposed thereon or therein, wherein the second coded data includes a plurality of second coded data portions, each second coded data portion being indicative of an identity of the second object and the position of the second coded data portion on the interface surface, wherein the method includes, in the sensing device:

- (a) sensing at least one second coded data portion;
- (b) generating, using the sensed second coded data portion, second indicating data indicative of the second object identity; and,
- 30 (c) transferring the second indicating data to the packing system, the packing system being responsive to the second indicating data to pack the first object in the second object.

35 13) A method of packing an object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a plurality of coded data portions, each coded data portion being indicative of an identity of the object, wherein the method includes, in a packing system:

- (a) receiving indicating data from a sensing device, the sensing device being responsive to sensing of the coded data to generate indicating data indicative of the identity of the object;
- (b) generating, using the received indicating data, object identity data indicative of the identity of the object; and,
- 5 (c) packing the object using the object identity data.

14) The method of claim 13, wherein the coded data portions are provided at respective positions on the interface surface, and wherein the method includes, in the computer system:

- (a) receiving indicating data from a sensing device, the sensing device being responsive to sensing of the coded data to generate indicating data indicative of the identity of the object and at least one of:

- 10 (i) the position of the sensed coded data portion;
- (ii) the position of the sensing device relative to the interface surface;
- (iii) an orientation of the sensed coded data; and,
- (iv) an orientation of the sensing device relative to the interface surface; and,

- 15 (b) generating, using the received indicating data:

- (i) object identity data indicative of the identity of the object;
- (ii) position data indicative of at least one of:
 - (1) the position of the sensed coded data portion;
 - (2) the position of the sensing device relative to the interface surface;
 - 20 (3) the orientation of the sensed coded data; and,
 - (4) the orientation of the sensing device relative to the interface surface; and,

- (c) generating, using the object identity data and the position data, orientation data indicative of the orientation of the object; and,
- (d) packing the object using the orientation data.

25 15) The method of claim 13, wherein the interface surface includes at least one region having at least one coded data portion provided therein, the at least one coded data portion being indicative of an identity of the region, and wherein the method includes, in the packing system:

- (a) receiving indicating data from a sensing device, the sensing device being responsive to sensing of the coded data to generate indicating data indicative of the region identity;
- 30 (b) generating, using the received indicating data, region identity data indicative of the identity of the region;
- (c) generating, using the region identity data, orientation data indicative of the orientation of the object; and,
- (d) packing the object using the orientation data.

16) The method of claim 13, wherein the object has a plurality of faces, each face having at least one coded data portion provided at a respective position thereon, and wherein the method includes, in the packing system:

5 (a) receiving indicating data from a sensing device, the sensing device being responsive to sensing of the coded data to generate indicating data indicative of the identity of the object and at least one of:

- (i) the position of the sensed coded data portion;
- (ii) the position of the sensing device relative to the face;
- (iii) an orientation of the sensed coded data; and,
- 10 (iv) an orientation of the sensing device relative to the face; and,

(b) generating, using the received indicating data, at least one of:

- (i) object identity data indicative of the identity of the object;
- (ii) position data indicative of at least one of:

- (1) the position of the sensed coded data portion;
- 15 (2) the position of the sensing device relative to the face;
- (3) the orientation of the sensed coded data; and,
- (4) the orientation of the sensing device relative to the face; and,

(c) identifying, using the object identity data and the position data, the face; and,

(d) packing the object using the determined face.

20 17) The method of claim 13, wherein the object has a plurality of faces, each face having at least one region including at least one coded data portion therein, the at least one coded data portion being indicative of an identity of the at least one region, and wherein the method includes, in the packing system:

25 (a) receiving indicating data from a sensing device, the sensing device being responsive to sensing of the coded data to generate indicating data indicative of the identity of the region identity;

(b) generating, using the received indicating data, region identity data indicative of the identity of the region;

(c) identifying, using the region identity data, the face; and,

30 (d) packing the object using the determined face.

18) The method of any one of claim 15 and claim 17, wherein the method includes, in the packing system:

(a) determining the orientation of the object using the face; and,

(b) packing the object using the determined orientation.

35 19) The method of claim 13, wherein the object is a first object adapted to be packed in a second object, the second object having second coded data disposed thereon or therein, wherein the

second coded data includes a plurality of second coded data portions, each second coded data portion being indicative of an identity of the object and the position of the second coded data on the interface surface, wherein the method includes, in the packing system:

- 5 (a) receiving second indicating data from a sensing device, the sensing device being responsive to sensing of the coded data to generate second indicating data indicative of the second object identity;
- (b) generating, using the received second indicating data, second object identity data indicative of the identity of the second object; and,
- (c) packing the first object in the second object using the second object identity data.

10 20) A method of packing an object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a plurality of coded data portions, each coded data portion being indicative of an identity of the object, wherein the method includes:

- (a) in a sensing device:
 - 15 (i) sensing at least one coded data portion;
 - (ii) generating, using the sensed coded data portion, indicating data indicative of the identity of the object; and,
 - (iii) transferring the indicating data to a packing system; and,
- (b) in the packing system;
 - 20 (i) receiving the indicating data;
 - (ii) generating, using the received indicating data, object identity data indicative of the identity of the object; and,
 - (iii) packing the object using the object identity data.

25 21) A method of packing an object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a plurality of coded data portions, each coded data portion being indicative of an identity of the object, wherein the method includes, in a computer system:

- (a) receiving indicating data from a sensing device, the sensing device being responsive to sensing of the coded data to generate indicating data indicative of the identity of the object;
- 30 (b) generating, using the received indicating data, object identity data indicative of the identity of the object; and,
- (c) causing, using the object identity data, a packing system to pack the object.

35 22) A method of packing an object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a plurality of coded data portions, each coded data portion being indicative of an identity of the object, wherein the method includes:

- (a) in a sensing device:
 - (i) sensing at least one coded data portion;
 - (ii) generating, using the sensed coded data portion, indicating data indicative of the identity of the object; and,
 - 5 (iii) transferring the indicating data to a computer system; and,
- (b) in the computer system;
 - (i) receiving the indicating data; and,
 - (ii) generating, using the received indicating data, object identity data indicative of the identity of the object; and,
 - 10 (iii) causing, using the object identity data, a packing system to pack the object.
- 23) The method of any one of claims 1, 13, 20, 21 and 22, wherein the coded data is substantially invisible to the unaided eye.
- 24) The method of any one of claims 1, 13, 20, 21 and 22, wherein the coded data is printed using infrared ink.
- 15 25) The method of any one of claims 1, 13, 20, 21 and 22, wherein the coded data is indicative of an EPC associated with the object.
- 26) The method of any one of claims 1, 13, 20, 21 and 22, wherein the coded data distinguishes the object from every other object.
- 27) The method of any one of claims 1, 13, 20, 21 and 22, wherein the coded data is redundantly encoded.
- 20 28) The method of any one of claims 1, 13, 20, 21 and 22, wherein the coded data is redundantly encoded using Reed-Solomon encoding.
- 29) The method of any one of claims 1, 13, 20, 21 and 22, wherein the coded data is provided on the interface surface coincident with visible markings representing at least one of:
 - 25 (a) object information;
 - (b) orientation information;
 - (c) the identity of the object; and,
 - (d) object status information.
- 30) The method of any one of claims 1, 13, 20, 21 and 22, wherein the interface surface is at least a portion of at least one of:
 - 30 (a) object packaging;
 - (b) object labelling; and,
 - (c) a surface of the object.
- 31) The method of any one of claims 1, 13, 20, 21 and 22, wherein the coded data is disposed over at least one of:
 - 35 (a) substantially all of any one of:

- (i) an entire object surface;
 - (ii) packaging; and,
 - (iii) a object label;
- 5 (b) more than 25% of any one of:
 - (i) an entire object surface;
 - (ii) packaging; and,
 - (iii) a object label;
- 10 (c) more than 50% of any one of:
 - (i) an entire object surface;
 - (ii) packaging; and,
 - (iii) a object label;
- 15 (d) more than 75% of any one of:
 - (i) an entire object surface;
 - (ii) packaging; and,
 - (iii) a object label.
- 32) The method of any one of claims 1, 13, 20, 21 and 22, wherein the packing system includes a computer system.
- 33) The method of any one of claims 1, 13, 20, 21 and 22, wherein the packing system communicates with a remote computer system.
- 20 34) A system for packing an object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a plurality of coded data portions, each coded data portion being indicative of an identity of the object, wherein the system includes a sensing device which:
 - (a) senses at least one coded data portion;
 - 25 (b) generates, using the sensed coded data portion, indicating data indicative of the identity of the object; and,
 - (c) transfers the indicating data to a packing system which is responsive to the indication to pack the object.
- 30 35) The system of claim 34, wherein the sensing device includes:
 - (a) a sensor for sensing the at least one exposed coded data portion; and
 - (b) a processor for generating, using at least some of the sensed coded data, indicating data indicative of the identity of the object.
- 35 36) The system of claim 35, wherein the sensing device includes a laser for emitting at least one scanning beam, the scanning beam being directed in first and second orthogonal directions to thereby generate a raster scan pattern over a scanning patch, the scanning patch being provided in the sensing region such that it exposes at least one coded data portion.

- 37) The system of claim 34, wherein the sensing device is adapted to perform the method of claim 1.
- 38) A system for packing a object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a plurality of coded data portions, each coded data portion being indicative of an identity of the object and the position of the coded data portion on the interface surface, wherein the system includes a packing system which:
- (a) receives, from a sensing device, indicating data generated in response to sensing of a coded data portion, the indicating data being indicative of the object identity;
 - (b) generates, from the received indicating data, object identity data indicative of the identity of the object; and,
 - (c) packs the object using the object identity data.
- 39) The system of claim 38, wherein packing system includes:
- (a) an input for receiving the indicating data;
 - (b) one or more manipulators for manipulating the object; and,
 - (c) a controller for controlling the manipulators, to thereby pack the object.
- 40) The system of claim 38, wherein the packing is adapted to perform the method of claim 13.
- 41) A system for packing a object, the object having an interface surface having coded data disposed thereon or therein, wherein the coded data includes a plurality of coded data portions, each coded data portion being indicative of an identity of the object and the position of the coded data portion on the interface surface, wherein the system includes a computer system which:
- (a) receives, from a sensing device, indicating data generated in response to sensing of a coded data portion, the indicating data being indicative of the object identity;
 - (b) generates, from the received indicating data, object identity data indicative of the identity of the object; and,
 - (c) causes, using the object identity data, a packing system to pack the object.
- 42) The system of claim 41, wherein the computer system is adapted to perform the method of claim 22.
- 43) The system of any one of claims 34, 38 and 41, wherein the packing system includes a computer system.
- 44) The system of any one of claims 34, 38 and 41, wherein the packing system communicates with a remote computer system.